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INVERSION AND FINITENESS IN SPANISH AND ENGLISH: DEVELOPMENTAL EVIDENCE FROM THE OPTIONAL INFINITIVE AND OPTIONAL INVERSION STAGES

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There is evidence to suggest that finiteness marking on verbs and subject-auxiliary inversion are related phenomena in English. In contrast, in Spanish there is evidence consistent with finiteness marking on verbs and the apparently similar phenomenon of subject-verb inversion being unrelated. In both cases, most of the evidence adduced comes from adult acceptability judgments and other adult psycholinguistic work. In the present article, we present evidence from child English and Spanish that supports the interrelatedness of finiteness and inversion in English, but not Spanish. Specifically, we show that child English speakers who are in the OPTIONAL INFINITIVE STAGE have variable judgments of finiteness that are predictive of their independently measured inversion judgments. In contrast, no such relationship appears to hold between the variance in finiteness and the variance in inversion judgments of child Spanish speakers of the same preschool age. We take this to be novel confirmation of the hypothesis that subject-auxiliary inversion in English takes finite tense as a necessary condition. In Spanish, in contrast, it appears that it is not necessary for a finite verb to move to the left periphery for subject-verb inversion.*

Keywords: subject-auxiliary inversion, V-to-I-to-C, finiteness, optional infinitive stage, optional inversion stage, child Spanish, child English, syntax

1. INTRODUCTION. One of the most enduring generalizations in the generative study of English is the idea that sentences like 1 and 2 are related.

(1) John can swim.
(2) Can John swim?

More specifically, it appears that the first auxiliary in a declarative sentence like 1 can be placed to the left of the subject to yield a question as in 2, a process traditionally known as SUBJECT-AUXILIARY INVERSION (SAI). The relation between the two types of sentences is not completely bidirectional, however. Although sentences such as 1 always have an inverted counterpart as in 2, sentences such as 2 do not always have an obvious noninverted source such as 1. For instance, 4 displays a clear inversion pattern, but undoing the inversion does not yield 3, the simple declarative to which 4 otherwise seems most akin.

(3) John swims every day.
(4) Does John swim every day?

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Putting 1/2 and 3/4 together, it is reasonable to conclude, as in Chomsky 1957, that the true generalization is that SAI affects not the first auxiliary, but rather the first finite element, whether this is an inherently finite auxiliary such as *can* or an abstract representation of present or past tense. In the latter case, moving tense to the left of the subject means that it is no longer adjacent to a suitable host, so *do* is inserted, a process traditionally known as *DO*-SUPPORT. This analysis thus accounts for the presence of finiteness on *do* in sentences like 4 and the absence of finiteness on *swim*.

Even simple data such as 3 and 4 thus make clear, both to the linguist and presumably to the child, that inversion in English questions crucially involves the representation of finiteness. Despite the initial impression that one might have from 1/2, and despite the traditional name of 'subject-auxiliary inversion', what SAI applies to is finiteness. In more recent syntactic theories, finiteness is represented as a feature on the syntactic node T (or I), and there is evidence that the inversion effect is caused by T moving to C (as in den Besten & Edmondson 1983, Pesetsky & Torrego 2001), another position often associated with finiteness.

Spanish also displays inversion in questions, particularly in WH-questions.[1]

(5) Juan compró un libro.
John bought a book
'John bought a book.'

(6) a. ¿Qué compró Juan?
what bought John
'What did John buy?'

b. *¿Qué Juan compró?
what John bought
'What did John buy?'

This is 'inversion' in the sense that we see subject-verb order in the declarative and verb-subject order in the question. Unlike English, however, the relation is completely bidirectional; the inverted pattern may always be undone to produce a noninverted (declarative) pattern. That is, the sort of evidence that we see in 3/4 in English, which shows that what undergoes inversion is the representation of finiteness, is lacking in Spanish. Data such as 6 are compatible with such an analysis, but they are equally compatible with the idea that it is the verb, and not finiteness per se, which is required to appear to the left of the subject.

English and Spanish are thus alike in both showing an inversion pattern in questions, but they differ in an interesting way: the basic facts about inversion in English show clearly that what is being inverted with the subject is finiteness, but the Spanish facts do not necessarily point to this conclusion. In this article, we explore this difference further, but in a novel way. We examine children's knowledge of both verb finiteness and inversion during the optional infinitive stage (Wexler 1994, 1998). In contrast with adult judgments of verb finiteness, which are very consistent, children have variable judgments of the acceptability of verb finiteness. This is a fortuitous property of child language, as it allows for the comparison of variance in judgments of finiteness with the variance in judgments of inversion constructions. If the variance in finiteness judgments predicts the variance in inversion judgments, it is consistent with the hypothesis that finiteness is crucially involved in the inversion phenomenon. In the absence of such a predictive relationship, no such inference can be drawn.

Notice that this kind of hypothesis testing cannot be done with neurotypical adults, whose judgments will have consolidated in such a way as to provide no variance that

[1] We put aside here the interesting question of how to account for Caribbean varieties of Spanish in which inversion is not always required (but see e.g. Baković 1998, Toribio 2000, Ordóñez & Olarrea 2006).

can be measured. We aspire, in this way, to put child language to use in refining syntactic theory—a theory that should account for both adults and children. We will see from a set of child language experiments that finiteness does predict inversion in a sample of four-year-old child English speakers, but that it does not in a sample of four-year-old child Spanish speakers. We take these results to be strong confirmation of the relevance of finiteness for SAI in English, and as at least suggestive evidence that no such connection exists in Spanish, as is implicit in many analyses of Spanish inversion (i.e. those that do not claim T-to-C movement; see below).

2. MORE ABOUT INVERSION IN SPANISH. As mentioned above, the inversion phenomenon in English is standardly taken to be an instance of movement from T to C. This is unsurprising given the fact that inversion affects finiteness in English, in the sense that both T and C are positions where finiteness is represented syntactically. It is thus interesting that in Spanish, not only is the evidence for the role of finiteness in inversion lacking, as we saw above, but there is also evidence that T-to-C movement is not involved in producing the inversion pattern.

For example, many researchers have noted that inversion in Spanish is obligatory in both matrix questions, as in 6 above, and embedded questions, as shown here in 7. This contrasts with the English examples in 8, which show the classical Germanic pattern, in which it is assumed that T-to-C movement does not take place in subordinate clauses (e.g. Torrego 1984, Fontana 1993, and Goodall 1993).

(7) a. No sabía qué querían esos dos.
not knew.1SG what wanted those two
'I didn't know what those two wanted.'
b. *No sabía qué esos dos querían.
not knew.1SG what those two wanted
'I didn't know what those two wanted.' (Torrego 1984:104)

(8) a. I don't know who John had visited.
b. *I don't know who had John visited. (Ordóñez & Olarrea 2006, ex. 20)

Some property of the embedded C in Germanic languages presumably prevents C from being a landing site for movement, thus producing the asymmetry observed here. The lack of such an asymmetry in Spanish casts some doubt on T-to-C movement being the mechanism underlying inversion in this language.

Another reason to doubt that T-to-C movement is the source of inversion in WH-questions in Spanish concerns the sensitivity to the nature of the WH-phrase. In English, inversion occurs with both D-linked and non-D-linked WH-phrases, but in Spanish, it is required only in the latter case. This is seen in the contrast in 9, where 9a shows that inversion is required in English even when the WH-phrase is D-linked, while 9b shows that this is not true in Spanish (see Torrego 1984, Ordóñez 1997, and Goodall 2010 for discussion).

(9) a. *Which of those books John bought?
b. ¿Cuáles de esos libros Juan compró? (cf. 6b)
which of those books John bought
'Which of those books did John buy?'

This sensitivity to the D-linked status of the WH-phrase in Spanish is unexpected if T moves to C when the Spec of C is occupied with a WH-phrase; this movement should not depend on the internal structure of that WH-phrase. English conforms to these expectations, but Spanish does not.

It has also been noted that frequency adverbs are able to appear between the WH-phrase and the verb in Spanish, which is surprising if the verb has raised to the C position (e.g. Goodall 1993, Suñer 1994).

(10) a. ¿Con quién [nunca] [jamás de los jamases] piensas (tú) hablar?
with whom never never of the nevers think you to.speak
'With whom wouldn't you ever in your life think of speaking?'
b. ¿A quién [casi] [nunca] le manda regalos la abuela?
to whom almost never to.him sends presents the grandma
'To whom does grandma almost never send presents?' (Suñer 1994:347)

This phenomenon occurs even with WH-phrases such as *a quién* 'to whom', as in 10b, that require inversion. The adverbs seen here are assumed to be within TP. Consequently, if the verb is to the right of them, then it too must be within TP. Notice that in English, the equivalent facts do not obtain.

(11) a. *With whom never do you plan to speak?
b. With whom do you never plan to speak?
c. *To whom almost never does Grandma send presents?
d. To whom does Grandma almost never send presents?

When the adverb *never* is clearly within TP, as in 11b and d, the sentence is well formed, but not when it is to the left of *do*, as in 11a and c.

Another piece of evidence to be considered here is that subjects are generally not able to intervene between auxiliary *haber* and the participle.

(12) ¿A quién ha (*Juan) visto (Juan)?
who has seen John
'Who has John seen?'

This would be unexpected if T-to-C movement occurred in WH-questions (Goodall 1993, Ordóñez 1997, Barbosa 2001). Such movement would place *ha* in 12 to the left of the subject, analogously to what happens to *has* in equivalent English sentences.

(13) Who has John seen?

The fact that *ha* is not allowed in this position in 12 thus constitutes an argument against an analysis in terms of T-to-C movement.[2]

We have now seen several pieces of evidence suggesting that the inversion pattern that we observe in Spanish WH-questions cannot be the result of movement of the verb from T to C. As mentioned earlier, this is an interesting result because it is consistent with the broader observation that Spanish inversion gives no indication of specifically targeting finiteness. Assuming that finiteness is represented syntactically in T and C, the lack of T-to-C movement may thus be seen as one more way in which inversion in Spanish is unrelated to finiteness. This contrasts with English, where there is strong evidence that inversion specifically targets finiteness and that T-to-C movement is involved.

This general conclusion that the mechanisms underlying inversion in English and inversion in Spanish are very different is reinforced by the experimental results on syntactic satiation in Goodall 2011. In this study, English- and Spanish-speaking participants judged the acceptability of a variety of sentence types in their own language multiple times. Certain sentence types, but crucially not others, exhibited the phenomenon of 'satiation', where acceptability judgments become more positive across presentations (e.g. Snyder 2000). Among those showing satiation were uninverted WH-questions in Spanish, as in 14, while the equivalent type of sentence in English, as in 15, did not show satiation.

[2] As an anonymous referee points out, auxiliary *haber* and the participle are sometimes able to be separated in more literary forms of the language, especially when the form of the auxiliary is relatively heavy (see e.g. Butt & Benjamin 1988 and Barbosa 1997). This phenomenon is clearly worthy of further exploration, though we do not engage in that task here.

(14) *¿Qué Juan compró en la tienda? (cf. ¿Qué compró Juan en la tienda?)
what Juan bought in the store
'What did Juan buy in the store?'

(15) *What John will buy at the store? (cf. What will John buy at the store?)
(Goodall 2011:36–37)

These results suggest that fundamentally different processes are at work in inversion constructions in the two languages.

If it is true that Spanish does not make use of T-to-C movement in WH-questions, what then is responsible for the inversion pattern in Spanish? More concretely, what prevents noninverted questions like 16 from arising?

(16) *Qué Juan compró?
what John bought
'What did John buy?'

While we do not resolve this question here, a number of plausible accounts have been discussed in detail in the literature. One possibility, for instance, is that preverbal subjects in Spanish are syntactically like fronted topics and appear in an A′-position within the left periphery of the clause. Given well-known notions of minimality, such subjects would then be expected to block WH-movement, thus preventing sentences like 16 from surfacing (Contreras 1989, Ordóñez 1997, Ordóñez & Treviño 1999, Zubizarreta 2001). Another possibility is that preverbal subjects appear within TP, as traditionally assumed, but that WH-phrases in Spanish target this same position as they make their way toward the left periphery. The preverbal subject and the WH-phrase thus compete for the same position; a fronted WH-phrase makes it impossible for a subject to be preverbal, thus accounting for 16 (Groos & Bok-Bennema 1986, Goodall 1993, 2011, Zubizarreta 1998, Gutiérrez Bravo 2002). A third possibility is that sentences like 16 are allowed by the grammar, but that the intervening subject makes the filler-gap dependency created by WH-movement more difficult to process, leading to unacceptability (Goodall 2010, 2011). This position is in line with the results from satiation mentioned above, if we assume that the satiation phenomenon observed with some sentence types reflects 'limitations of sentence processing, rather than genuine constraints of the speaker's grammatical competence' (Snyder 2000:580). A fourth possibility is that the WH-phrase and the verb must be PF-adjacent and that an intervening subject breaks this adjacency (Buesa-García 2011). All four of these approaches are consistent with the view that Spanish inversion does not crucially involve the representation of finiteness. What they all have in common is that they account for the inversion phenomenon in Spanish by means of the interplay between the WH-phrase and the subject; finiteness plays no direct role.

Despite the evidence against T-to-C movement in Spanish, however, and despite the existence of plausible alternative analyses, as we have just seen, there has nonetheless been some reluctance among researchers to fully accept this conclusion, and many have continued to assume that T-to-C movement is the source of inversion in Spanish WH-questions (see e.g. Gallego 2006 and Beas 2007). This reluctance to abandon T-to-C movement in Spanish is in fact not unreasonable, for conceptual reasons. Analyses of inversion in English and other languages have often attributed the effect to fundamental properties of the grammar. In Rizzi 1996, for instance, the WH-CRITERION has the effect of requiring that the WH-phrase and T be in a Spec-head configuration. When the WH-phrase is a nonsubject, this requirement can only be satisfied if both the WH-phrase and T move into a higher projection, thus effectively making T-to-C movement obligatory. If these are the forces behind inversion in English, it is difficult to see why they would not

have a similar effect in Spanish. Another influential analysis has been that of Pesetsky and Torrego (2001), in which T-to-C movement is what makes it possible for a nonsubject WH-phrase to move to Spec of CP. In their analysis, matrix interrogative C has an uninterpretable [T] feature and an uninterpretable [wh] feature, both with the EPP (extended projection principle) property. For reasons having to do with basic architectural properties of the grammar, the [T] feature must be satisfied (through T-to-C movement) before the [wh] feature can be (through WH-movement). Here, too, the analysis would thus lead one to expect that T-to-C movement would be required in Spanish as well.

Child language gives us a unique opportunity to probe this question more deeply. As we have seen, inversion in English clearly involves inversion between the subject and finiteness, as evidenced in the phenomenon of *do*-support, and this idea is captured in the T-to-C movement analysis that is standardly adopted. In Spanish, by contrast, there is no *do*-support or any other evidence suggesting (to the linguist or to the child) that it is specifically finiteness that appears to the left of the subject in the inversion pattern. Moreover, there is substantial empirical evidence that T-to-C movement is not the mechanism that produces the inversion pattern in Spanish, a result consistent with this conclusion about finiteness. If all of this is correct, despite the potential conceptual concerns just discussed, we would expect it to be reflected in the course of children's development. In particular, we would expect the development of finiteness and inversion to be closely intertwined in children acquiring English, but we would not have this expectation for children acquiring Spanish.

3. NONINVERSION AND FINITENESS IN CHILD SPANISH AND ENGLISH: OBSERVATIONAL STUDIES. Let us begin our discussion of child languages by reviewing what is known about the development of inversion and finiteness in children's production. For English, there is an exceptionally well-documented phenomenon in children of uninverted WH-questions (Bellugi 1965, Brown 1968, 1973, Cazden 1968, Ingram & Tyack 1979, Kuczaj & Brannick 1979, Erreich 1984, Stromswold 1990, Santelmann et al. 2002), which consists of a protracted period during which children produce a modal, auxiliary verb, or a form of copula *be* to the right of the subject, as in these examples from Ingram and Tyack (1979).

(17) Where the raisins is?
(18) What I can eat?
(19) How this piece could go in?
(20) How this thing could go in?
(21) Where he is?
(22) Where you did go?
(23) What he is going to do?
(24) How much I do weigh?

It is natural to think of this phenomenon as being related to finiteness in the sense that what appears to be the finite verb has remained to the right of the subject, perhaps raising to I but no more, as in Figure 1.

This lack of raising to C would make sense if the child's verb is not fully specified for finiteness (or is not consistently specified for finiteness). Assuming that C is only able to attract finite verbs, movement to C should happen as often as verbs are marked for finiteness. Children learning English pass through a period during which verbs are not always marked for finiteness. The protracted development of finiteness marking has been referred to as the OPTIONAL INFINITIVE STAGE (Wexler 1994, 1998).

3.1. NONINVERSION AND THEORETICAL ACCOUNTS OF OPTIONAL INFINITIVES. Notice that such an account of inversion being bled by the OPTIONAL INFINITIVE phenomenon

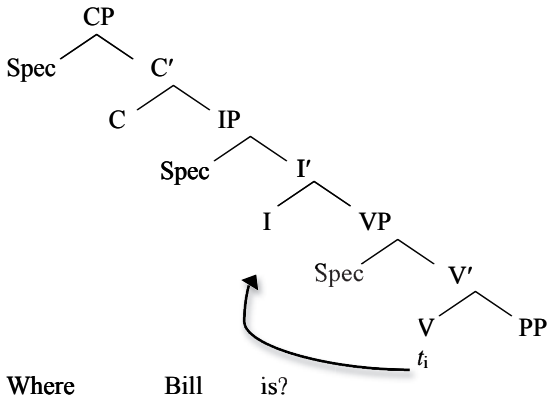

FIGURE 1. Partial movement of a verb to I in child English.

depends on several critical features of linguistic representation. First, there has to actually be a syntactic structure above nonfinite verbs to which WH-elements could move. Second, it has to be possible for the morphological form of child language verbs to not have a one-to-one relationship to their syntactic specification. Rizzi's (1993) TRUNCATION account of optional infinitives adopts the opposite assumptions. As we understand it, two of the critical assumptions about the optional infinitive stage, upon which Rizzi based his theory, are that there are no nonfinite auxiliaries and that there are no nonfinite verbs in WH-questions. Examples 17–24 in child English are one kind of evidence that both such structures are possible. We have also given evidence in Grinstead, Donnellan, et al. 2014 that child English speakers (n = 62, mean age = 4;7) will indeed judge morphologically nonfinite verbs as grammatical (e.g. *He paint a fence*; *She watch a cat*; ibid. p. 306, exs. 11b and 15b), and parallel evidence is given below in our report of child English judgments of uninverted WH-questions with (by hypothesis) nonfinite auxiliary verbs, which includes acceptance of them. In sum, Rizzi's theory claims that there is no syntactic structure above the nonfinite verb, including the left periphery, to which WH-elements move, and it assumes that nonfinite verbs cannot occur in WH-questions, neither of which seems supported by the evidence. Consequently, if the relationship we wish to argue for between noninversion and nonfiniteness in the left periphery exists, and the available evidence of nonfinite WH-questions being a real grammatical option for children is correct, the truncation hypothesis cannot account for the finiteness-inversion connection we wish to account for.

Somewhat more consistent with the facts as we understand them, Wexler's (1998) AGREEMENT-TENSE OMISSION MODEL (ATOM) uses the UNIQUE CHECKING CONSTRAINT (UCC), in concert with a MINIMIZE VIOLATIONS constraint as part of an OPTIMALITY-THEORETIC account, to explain the optional infinitive phenomenon. This account could, in principle, be consistent with our observation, in that it allows for morphology and syntax to not have a one-to-one relationship in child verbs. Specifically, morphologically nonfinite verbs on this account may lack syntactic agreement, syntactic tense, or both. A version of ATOM, modified for our purposes, could allow that the verbs which raise from I to C have at least syntactic tense features, if not also agreement features, and that verbs which do not raise from I to C may have agreement features, but have no tense features, and possibly lack agreement features as well. Specifically, on the ATOM account of this phenomenon, one morphological version of a syntactically nonfinite verb in child English may be [+AGR, −TNS], as in *He like ice cream* (Wexler 1998:45, ex. 20b), while another morphologically nonfinite verb may be [−AGR, +TNS], as in *Him*

like ice cream (ibid., ex. 20c). Notice that the morphological form of both [+TNS] and [−TNS] verbs on this account is the identical bare stem *like*. On the ATOM account, an independent morphological component of grammar (following Halle and Marantz's (1993) DISTRIBUTED MORPHOLOGY model) is responsible for the particular word form used. To make our modified version of ATOM work, we would have to depart from its precise formulation of the relationship between syntax and morphology, because there is no clear means of determining, strictly on the basis of English verb morphology, that a given form lacks tense vs. agreement vs. both tense and agreement simultaneously.

This is simply one of the limitations of studying the optional infinitive stage, even in a language like Spanish, which has relatively rich morphology but still uses a portmanteau morpheme to express tense and agreement. It is impossible, just using the morphology of the verb, to know if the syntactic features of agreement vs. tense are missing or present. Similarly, English uses portmanteau morphemes (e.g. third singular *-s*) to mark tense and agreement, but to make matters worse, it has ubiquitous zero marking (e.g. zero person and number marking on present-tense verbs: *I like*, *you like*, *we like*, *they like*), making it even more difficult to know, on the basis of morphological form, what syntactic features are present.

That the precise syntax-morphology mapping proposed in ATOM cannot be right (though the spirit of the proposal clearly is) is illustrated by the fact that it gets predictions about nominative case marking wrong for child English. On the ATOM account, agreement, and not tense, is critical for nominative case marking. Because it assumes that third singular *-s* is the consistent morphological marker of syntactic agreement, which it takes to be essential for nominative case marking (a controversial assumption in itself), there should be no examples of sentences like *Him likes ice cream*. This turns out to be incorrect, in both production (e.g. Pine et al. 2005) and judgment studies (Grinstead, Donnellan, et al. 2014). As we show in Grinstead, Donnellan, et al. 2014, tense marking does predict nominative case marking, but it does so with cross-morphologically nonfinite forms (nontensed, nonagreeing, or both) predicting acceptance of nonnominative case forms.[3] Summarizing, ATOM allows for structure to exist above a nonfinite verb, and it also allows relative independence of morphology and syntax, though the exact relationship that it assumes may not be correct. By embodying these traits, it could be consistent with the idea that nonfinite verbs may exist in WH-questions and not move from I to C. At least, it is possible to implement this idea within the framework of ATOM's assumptions.

On our proposal, INTERFACE DELAY (Grinstead 1998, 2004), there are two developmental phenomena at play. The first is the morphology-syntax mapping of the language in question. For English, we see that there exists a small set of tense- and agreement-related morphemes that seem to arise as a group (*is*, *am*, *are*, *was*, *were*, *have*, *has*, *had*, *-s*, *-ed*, *does*, *do*, *did*, *will*, and modal verbs). The exact mapping of tense, agreement, grammatical aspect, and mood to each of these forms is not a settled question for adult English theories of syntax and morphology. Consequently, it is not straightforward to make claims about which syntactic features map to which morphological forms in adult, much less child, language. The second developmental trajectory is of semantics-pragmatics with syntax. We claim that anaphoric definites, including definite DPs such as null subjects, DPs marked with the anaphoric definite determiner, and direct object

[3] And, as pointed out by Rispoli (2005), finiteness becomes the most predictive variable of nonnominative case marking only after finiteness reaches the 60% correct level. Before that, lexical development is more predictive. See Rispoli 1999, 2005 and Grinstead, Donnellan, et al. 2014 for details.

clitic pronouns, will be slow to develop, while local syntactic relationships, including nominal plural marking and noun-adjective agreement, will undergo no such delay. Tense, from this perspective, falls into the anaphoric-relationship category as a morpheme that must always be situated temporally in discourse, relative to speech time (e.g. Bittner 2011). Interface delay makes no claims as to the specific mapping of the relationship between syntax and morphology. However, the existence of an independent component of grammar dedicated to morphology by itself seems inevitable (see Zwicky 1990, 1992, Aronoff 1994, Maiden 2005). Thus, while in our view the careful morphological theoretic work of determining the exact syntax-morphology correspondence of tense and agreement in English remains to be worked out, our claim is that syntactic tense in child language does not function as it does in adult English, because children, unlike adults (most of the time), overassume that their interlocutors share their presuppositions regarding the salience of discourse antecedents, including temporal antecedents, in the CONVERSATIONAL COMMON GROUND, in the sense of Stalnaker 1974.

Notice that on this account, on the occasions that children produce nonfinite verbs, they are doing what adults do when they produce nonfinite forms, but have simply mistaken how much information their listeners have as to what is salient (as in Piaget's 'egocentric stage'; see e.g. Piaget 1952). Adults, of course, use root nonfinite verbs in discourse regularly, as in the following (Grinstead 2016:356, exs. 29–34).

(25) Q: What is Wallace doing, Gromit?
A: Eating cheese!
(26) Q: What does Wallace do every day after work, Gromit?
A: Eat cheese!
(27) Q: What has Wallace done since he got home, Gromit?
A: Eaten cheese!

These examples illustrate that although the three root nonfinite forms (25A, 26A, 27A) have absolute tense interpretations in the present, these interpretations do not arise from their own morphological markings, but rather from the morphological markings of the tense of the immediately preceding questions. Note as well that all of the present-tense interpretations of the answers in 25–27 may be shifted to past tense, without changing their own morphology, but rather by changing the morphology of the verb in the preceding questions.

(28) Q: What was Wallace doing, Gromit?
A: Eating cheese!
(29) Q: What did Wallace do every day after work, Gromit?
A: Eat cheese!
(30) Q: What had Wallace done since he got home, Gromit?
A: Eaten cheese!

These facts illustrate that a form may have various temporal interpretations associated with it, without there being explicit morphological markings to reflect them. In this way, children's nonfinite verb forms may have semantic interpretations similar to adult forms, but lack the syntactic tense and agreement features necessary to license verb movement out of the clause to the left periphery.

The interface delay claim, then, following related hypotheses (Avrutin 1994, Lasser 1998, 2002), is that there is a syntax-semantics-pragmatics learning trajectory, which seems protracted. Semantics and pragmatics, in this sense, drive children to use morphological forms, which generally seem adult-like, in non-adult-like ways, because they overassume that nonfinite forms (and other definites) are felicitous, when they are in

fact not. It is of course also true that the syntax-morphology mapping has to be acquired. How this trajectory and the syntax-semantics-pragmatics trajectory interact is, for us, at the heart of understanding the optional infinitive phenomenon. This is the case because it seems clear that, on the one hand, children use verb forms that are non-adult-like vis-à-vis tense and agreement morphology, and, on the other hand, anaphoric constructions are delayed because verb finiteness fits into the cross-categorical generalization of interface delay.

What this means for the interaction of morphosyntactic finiteness and syntactic SAI in child English is that children overuse a syntax of nonfiniteness for their verbs, by not specifying them for tense when an adult would. When they do this in a question, which an adult with appropriate assumptions about temporal felicity would not, their morphologically ambiguous, syntactically nonfinite verbs are prevented from raising above I because they do not carry finite syntactic tense features, and an uninverted WH-question, with a nonfinite verb, is produced.

While we believe that such an account could be squared with ATOM, it seems unlikely to be consistent with truncation, with its WH-criterion assumption (Rizzi 1991). On a WH-criterion-type account, a nonfinite verb in a WH-question should produce an ungrammatical question, even in the child's grammar (assuming the CONTINUITY HYPOTHESIS), as the tense morpheme, on this account, is responsible for moving a [+wh] feature into the C position, which attracts a WH-element to its specifier. However, while this account seems to work well for Germanic languages with their V2 and English-type 'residual V2' structures, it does not account for many (if not most) of the world's languages, which have WH-movement to the left periphery, but lack subject-auxiliary or subject-verb inversion. English is in the minority in this respect. If WH-movement occurs independently of V-to-C movement of finiteness, then a WH-question with an uninverted nonfinite verb is simply another version of a nonfinite sentence, which happens to involve finiteness movement to C, which happens to not occur occasionally in child English because children assume that their temporal reference is salient enough in discourse to not have to be marked on their verbs. This lack of temporal marking on the verb restricts it to I, as only finite verbs can move to C.

3.2. MORPHOLOGICALLY ADULT-LIKE BUT SYNTACTICALLY UNDERSPECIFIED FORMS. One of the critical assumptions of our account, then, is that a form may appear morphologically adult-like, but lack full specification of the syntactic features it would have in the adult language. Precedents for such an assumption in the developmental syntactic literature include Sano and Hyams's (1994) account of the occurrence of null subjects in child English with forms that carry *-s* or *-ed* marking (while null subjects do not occur with forms of *be*). Technically, they propose that these verbs are analyzed as participles and not as finite verbs, but the spirit of the proposal seems similar: a verb form appears morphologically adult-like, but its syntactic features are not the same as those of that form in the adult grammar. In the same vein, Schütze and Wexler's (1996) ATOM account, as we have pointed out, allows that a morphological form such as *cried* in children's utterances such as *Him cried*, in spite of appearing to be fully inflected, could express tense but not agreement. One could also claim that in the first stages of 'U-shaped' learning of tense (e.g. Marcus et al. 1992)—during which children produce *ate* apparently correctly before they come to *eated* and finally back to *ate*—the irregular *ate* is a verb form that is morphologically adult-like but lacking in tense features. Others, including Culicover (1999) and Tomasello (1995), assume that morphologically unanalyzed forms may constitute an intermediate step in the process of learning the adult grammar. This view seems to be supported by adult morphological-processing research, which shows that adults appear to make use of both stem + affix and morpho-

logically unitary versions of inflected forms (e.g. Baayen et al. 2002). If the same morphological processing is involved receptively in building lexical representations of finite verbs, it seems plausible that children could begin with an unanalyzed form, such as *eats*, which only later comes to be analyzed as a stem plus an affix, with a general meaning across utterances, stored in the lexicon.

We assume, therefore, that apparently inflected forms of *do* and *be* can be underspecified for syntactic finiteness features in some stage of child language, as proposed by interface delay. Returning to the relationship between finiteness and inversion in child English, the hypothesis that optional inversion depends on optional verb finiteness in child English would gain plausibility if children at this age were known not only to invert subjects and verbs optionally, but also to mark verbs as finite optionally across the board. In fact, the period of development corresponding to optional inversion seems to be largely coextensive with the optional infinitive stage (Wexler 1994, 1998), during which verbs are marked only intermittently for finiteness. Following this intuition, Santelmann and colleagues (2002) give a sample of preschool-aged children an elicited imitation experiment that includes inverted yes/no questions containing either a modal verb or a main verb with *do*-support or a form of the copula. Children in the sample fail to invert subjects and verbs in questions with verb forms that require tense inflection (*do*-support and copula *be*), but do not fail to invert with forms that do not require finiteness inflection (modal verb *can*). This is consistent with the hypothesis that verb finiteness plays a critical role in the adult SAI construction and that children who fail to invert subjects and verbs are really presenting with a secondary reflex of the optional infinitive stage, which we could call the OPTIONAL INVERSION STAGE.

While noninversion is well documented in child English, there is essentially no evidence that children learning Spanish or other Romance languages go through such a stage. Spontaneous-production studies of Italian, Catalan, and Spanish have shown virtually no examples of uninverted WH-questions, as illustrated in Table 1, which summarizes longitudinal studies of younger Italian and Catalan children and a cross-sectional study of older Spanish-speaking children, who are nonetheless in the optional infinitive stage.

LANGUAGE	ITALIAN	CATALAN	SPANISH
STUDY	Guasti (1996)	Grinstead (2001)	Grinstead et al. 2007
CHILDREN	Diana (1;10–2;6) Guglielmo (2;2–2;11) Martina (1;8–2;7)	Gisela (1;7–3;0) Guillem (1;0–3;1) Laura (1;7–3;3) Pep (1;0–3;0)	*N* = 24 children in Mexico City (3;0–6;8)
Total WH-Qs	171	146	11
Total WH-Qs with overt subjects	67	37	5
Total inverted WH-Qs with overt subjects	64	37	5

TABLE 1. Results of spontaneous-production studies of subject-verb inversion in child Italian, Catalan, and Spanish, compiled from Guasti 1996, Grinstead 2001, and Grinstead et al. 2007.[4]

A potential confound in null-subject languages such as Italian, Catalan, and Spanish, of course, is that an overt subject is necessary to determine whether subject-verb inversion has taken place, and these languages show very low proportions of overt subjects, especially in child language (e.g. Bel 2003, Grinstead 2004). Nonetheless, the existing evidence suggests that children do not spontaneously produce uninverted WH-questions.

[4] The spontaneous-production data in Grinstead et al. 2007 was primarily narrative in nature, which greatly reduces the number of discourse contexts that lend themselves naturally to questions.

3.3. THE OPTIONAL INFINITIVE STAGE IN CHILD SPANISH. Child English and child Spanish thus seem very different with regard to inversion, but that is not the case with regard to finiteness. There are some works in the child language literature that claim there is a deep divide between languages with and without optional infinitives, and that Spanish is one of the languages lacking them (e.g. Phillips 1995, Wexler 1998, Bel 2001). However, the great majority of empirical work on the topic finds that Spanish-speaking children do pass through an optional infinitive stage (e.g. Kernan & Blount 1966, Pérez-Pereira 1989, Radford & Ploennig-Pacheco 1995, Clahsen et al. 2002, Liceras et al. 2006, and Grinstead, De la Mora, Vega-Mendoza, & Flores 2009). Further, child Spanish speakers with specific language impairment (SLI) appear to pass through an EXTENDED OPTIONAL INFINITIVE STAGE (e.g. Grinstead et al. 2013, Grinstead, Lintz, et al. 2014), confirming the generalization that nonfinite verb use in typical and atypical child language development is widespread, if not universal.

To begin with, the optional infinitive stage appears to allow a diversity of nonfinite root verb forms, which have in common that they are not marked for tense and/or agreement. In English, this includes bare-stem verbs (e.g. *He eat*), but also bare progressive participles (e.g. *I sliding down*; Nina, Suppes corpus; Suppes 1974). In French, German, and Swedish, an actual morphological infinitive form is produced, and in Greek, a form that is ambiguous between being a third singular present indicative and a present perfective participle is used (e.g *Tuto seli* 'This want (3SG.PRS)'; Spiros, from Varlokosta et al. 1996; see also Katis 1984 and Stephany 1997). From this perspective, one might expect a minimal verb form in Spanish, such as the root plus a theme vowel (e.g. *cant-a* 'sing'), to be a good candidate for a root nonfinite form. It serves as a second-person familiar imperative (*¡Canta!* 'Sing!'), as well as the impersonal (e.g. *se habla* 'one speaks'), the first of which cannot inflect for tense and the second of which may lack (number) agreement in certain dialects (e.g. *Se corta árboles* 'Trees are cut'; see Rigau 1991 for similar examples in Northwest Catalan) and never marks person agreement. This lack of finiteness (tense and agreement) marking in the adult language associated with the bare stem makes it a prima facie good candidate for serving as a nonfinite form in child Spanish.

There is controversy in the literature, however, arising from two facts. First, the bare-stem form (root + theme vowel) is also used as a third-person singular present indicative form (as in Greek); this could lead researchers to interpret it as an adult present-tense form even if it is not. This is a plausible situation when analyses are based only on written transcripts of spontaneous-production data, with limited access to discourse context. Second, the clearest way to see that this form is not being used in an adult way is to see it occur with an overt subject that does not match its putative person and number features (e.g. *Yo pone* 'I puts'; Carlos, 3;3, from Grinstead 1998), because Spanish expresses tense via a portmanteau morpheme that also expresses subject-verb agreement. Unfortunately, very few verb forms occur with an overt subject in even adult (non-Caribbean) Spanish (e.g. 19% for Mexican Spanish first-person pronouns in Otheguy et al. 2007), let alone in child Spanish, in which even fewer occur (Bel 2003, Villa-García & Snyder 2009). This makes it much trickier to know when a child is using an apparently third-person singular form to refer to a plausible third-person singular antecedent and not to themselves. In the following three examples from Grinstead, De la Mora, Pratt, and Flores (2009:245, exs. 22–24), the discourse context makes it clear that the children are using third singular forms to refer to themselves.[5]

[5] Note that in all three cases, the child uses the root, which diphthongized in the evolution of Spanish from Latin for phonological reasons (*pod–pued*, *quer–quier*), with the addition of the 'e' theme vowel, which is taken to be a derivational morpheme (Harris 1991), to create a stem (*puede*, *quiere*). Stems lack any other

(31) No puede. (Eduardo; 2;5.29)
not can (root + *e* theme vowel)
'Cannot.' [Eduardo responds to the investigator's question of whether he can put two pieces of a puzzle together.]

(32) No quiere. (Graciela; 2;3.4)
not want (root + *e* theme vowel)
'Does not want.' [Graciela responds to mother asking her if she wants a band-aid.]

(33) Sí puede nadar. (Carlos; 2;9.15)
EMPH can (root + *e* theme vowel) swim.INF
'Can too swim.' [Carlos responds to investigator asking if he can swim: '¿Puedes nadar?']

The generalization is visible in production studies, such as Bedore & Leonard 2001, 2002 for child Spanish, and in Rice, Wexler, & Hershberger 1998 for child English, in which we find a similar pattern of finiteness errors. Bedore and Leonard report typically developing three-year-old Spanish speakers with 15% finiteness-marking errors, while Rice and colleagues (1998) report 20–40% errors for child English speakers of the same age. While these percentages are not exactly the same, they are not impossibly different. In both studies, five-year-old typically developing children are near ceiling with 5% errors.

In studies of child Spanish speakers diagnosed with SLI, the evidence for the existence of an extended optional infinitive stage, in Rice and Wexler's (1996) terms, is strong. Grinstead, De la Mora, Pratt, & Flores 2009 shows that child Spanish speakers diagnosed with SLI judge nonfinite forms (both bare-stem forms, e.g. *Yo abre* 'I opens', and morphological infinitive forms, e.g. *Yo abrir* 'I to open') as grammatical significantly more often (56%) than age-matched controls (20%). Grinstead, De la Mora, Vega-Mendoza, & Flores 2009 further shows, using an elicited-production task, that children with SLI produce significantly more finiteness errors (17%) than do age-matched controls (5%), and Grinstead, Lintz, et al. 2014 shows that in spontaneous production, child Spanish speakers produce significantly more finiteness errors (5%) than do age-matched controls (< 1%). Finally, using a discriminant function analysis, Grinstead et al. 2013 shows that, using finiteness marking, it is possible to distinguish five-year-old Spanish speakers with SLI from typically developing age-matched controls with 89% sensitivity and 89% specificity.

In sum, the evidence that typically developing and language-disordered child Spanish speakers pass through an optional infinitive stage and an extended optional infinitive stage, respectively, is strong. The language-particular properties of Spanish as a null-subject language that marks tense and agreement as a single portmanteau morpheme and methodological limitations of early spontaneous-production studies combine to make it harder to detect these facts. Nevertheless, they exist.

It thus appears that both Spanish-speaking and English-speaking children pass through an optional infinitive stage that ends at roughly 4;6 (Rice et al. 1998 for English; Grinstead, De la Mora, Vega-Mendoza, & Flores 2009, Grinstead, Lintz, et al. 2014 for Spanish). In addition, we have seen that there is evidence that English-speaking children pass through an optional inversion stage, but that there is no similar evidence that Spanish-

overt inflectional marking, by definition. The inflectional marker they would take in the adult language involves deletion of the 'e' theme vowel and replacement of it with the 'o' morpheme, which is a portmanteau for, at least, first-person singular agreement and present tense.

speaking children do. With these generalizations in mind, we pose the following two research questions:

(i) Is there a connection between the optionality of finiteness in child English speakers and their optionality of inversion? That is, does the degree of optionality they have with finiteness predict how much optionality they will have with inversion?

(ii) Is there a similar connection between the optionality of finiteness and inversion in child Spanish speakers? That is, does their degree of optionality with finiteness predict how much optionality they will have with inversion?

We address these questions through a series of four experiments measuring acceptability in English-speaking and Spanish-speaking children. Given the properties of adult English that we have seen, we would expect the answer to the first question to be positive. Finiteness and inversion are closely intertwined in adult English, so if children are sensitive to this, their development of these two properties should go hand in hand. In Spanish, by contrast, we have seen that finiteness and inversion apparently bear no special relationship in the adult grammar, so it is reasonable that these two properties would develop independently of each other in children, and the answer to the second question would thus be negative.

All of this assumes, however, that children are extraordinarily sensitive from an early age to the very subtle properties of finiteness and inversion in each language. If this assumption is not correct, the answers to the two questions above might be either both positive or both negative.

4. ENGLISH EXPERIMENTS: METHODS. In the following sections, we report the results of four GRAMMATICALITY CHOICE TASKS (Pratt & Grinstead 2008). We have found in previous work that this variant of the classical grammaticality judgment task (e.g. McDaniel & Cairns 1990) is advantageous for testing children's knowledge of optional phenomena. While the classical grammaticality judgment task presents children with a single utterance and asks for a yes/no-type judgment (analogous to the yes/no-response method in some adult acceptability studies; see Cowart 1997), the grammaticality choice task presents children with a putatively child-specific sentence (e.g. an uninverted WH-question) and its corresponding adult variant (e.g. an inverted WH-question). Because children are asked to choose between two sentences they hear (and the task is thus a forced-choice task, as in adult acceptability studies; see Schütze & Sprouse 2014), we do not have to be concerned with a 'yes' bias, as in the classical grammaticality judgment task, though we do have to be careful about counterbalancing the order of presentation of adult-like and child-particular sentences, and which puppet produces their sentence first and which puppet gives the adult-like sentence. In general, we have found when using the grammaticality choice task that children appear to know more about the constructs we are testing and we lose fewer children for failing to understand the task than we do with the traditional grammaticality judgment task.

In grammaticality judgment work, we count on warm-up items to 'tune' children to the degree of ungrammaticality we are concerned with and the type of ungrammaticality we are concerned with. Experience has shown that if you do not show children examples of ungrammaticality that are of the same degree of ungrammaticality you want to test, results will be uninterpretable. Following Stromswold (1990), for example, our initial attempts to work with grammaticality judgment employed warm-up and filler items that were not just slightly ungrammatical, but rather were a completely unordered sequence of words from an originally sensible sentence. We got very inconsistent and

uninterpretable results from this experiment,[6] which signaled to us the importance of this variable. The fact that morphological differences and word-order differences are the kinds of differences we are concerned with in both of the following experiments implies that warm-ups and fillers should be either slight word-order permutations of grammatical sentences or slight morphological deformations of well-formed words, in order to tune participants to the degree of ungrammaticality we are concerned with.

4.1. EXPERIMENT 1: FINITENESS MARKING IN CHILD ENGLISH. In this experiment, we seek to measure child English speakers' judgments of finite and nonfinite sentences, so that these judgments can be compared with their judgments of inverted and uninverted WH-questions.

Notice that on our account, a morphologically adult-like form may in fact be unspecified for either tense or agreement or both. For this reason, we use the grammaticality choice task to measure the change in children's judgment variability. Specifically, we measure variability at choosing the adult-like form over the clearly child-particular form as our metric of finiteness. If the child has an adult-like grammar, only the adult-specific form will be acceptable. If the child has a grammar that allows root nonfinite verbs, either form will do, because *He eats* could be nonfinite. A greater insistence on the adult form being the only valid one will increase the mean and decrease variance. Less such insistence will decrease the mean and increase the variance. In this way, we are able to measure increasing finiteness in spite of the opacity of morphological form.

PARTICIPANTS. Of 113 monolingual English-speaking children in Central Ohio who took the VERB FINITENESS TASK, sixty-three passed at least three of the four filler items, detailed below, on this test as well as the INVERSION TASK. For the sixty-three children who passed fillers on both tests, the age range was 3;1–5;11, and the mean age was 4;10. Though the number of children not passing fillers may seem high, the vast majority of the 'filler failers' were three-year-olds, which, we discovered in the process of doing this project, was the lower-bound age at which children could reliably do the grammaticality choice task.

PROCEDURES. Children were introduced to two puppets (a lion and a penguin) and were told that these animals were babies and did not talk like big kids, such as the participants, and consequently that in this game, we would need the children's help in showing the puppets how to improve their language by telling the puppets which one of them had said their sentence best. Children were then shown a sequence of static images in a binder. For each image, each of the two puppets would make a statement containing either a finite or a nonfinite verb and the child would have to say who had said it best.

The test consisted of four warm-up sentences to familiarize the child with the format of the test, twenty-four sentences that called for finiteness judgments, and four filler items. During warm-ups, children were given feedback, in particular, emphasizing that neither puppet was more likely than the other to say the sentence correctly and that which one went first was also not an indicator of which sentence was best. The warm-ups were structured so that each puppet was wrong twice and right twice, went first twice, and went last twice. No corrective feedback was given after the warm-up sentences. The warm-up and filler sentences did not contrast in finiteness, but rather varied as a function of adding *-ing* to progressive verbs, as in the following.

[6] In fact, a child actually answered, when we asked if he thought the sentence was good or bad, 'Well, it's not THAT bad'.

(34) a. *The girl is swim.
b. The girl is swimming.
(35) a. The girl is picking flowers.
b. *The girl is pick flowers.
(36) a. Mickey is dancing.
b. *Mickey is dance.
(37) a. *The bear is watch the butterfly.
b. The bear is watching the butterfly.

Experimental items consisted of calling children's attention to a picture in the binder, as in Figure 2, accompanied by sentences such as the following.

(38) Experimental item for verb finiteness
Penguin puppet: The sun happy.
Lion puppet: The sun **is** happy.
Test administrator: Who said it better, the penguin or the lion?

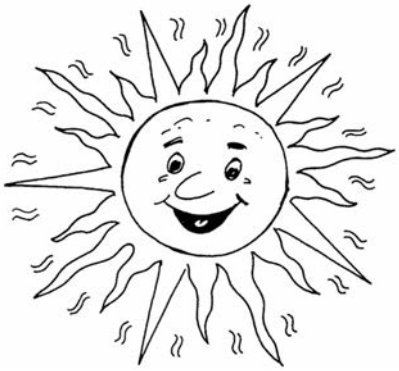

FIGURE 2. Sample picture to accompany verb finiteness sentences.

The finiteness morphemes tested in this experiment included copula and auxiliary *be*, past tense *-ed*, and third-person singular *-s*. The distribution of items and sample sentences are given in Table 2.

	ADULT FORM	NONFINITE FORM	# OF ITEMS
Copular *be*	Scooby **is** loud.	Scooby loud.	6
Auxiliary *be*	Mr. Cowboy **is** riding a horse.	Mr. Cowboy riding a horse.	6
Past tense *-ed*	The bear play**ed** in the sand	The bear play in the sand.	6
3rd-person singular *-s*	Snow White sing**s** to the animals.	Snow White sing to the animals.	6

TABLE 2. Finiteness morpheme types and sample sentence pairs for the English task.

Children judged experimental and filler items presented in one of three different orders. There was no effect of order of presentation ($p > 0.05$). All finiteness items were judged by a sample of five adult, monolingual English speakers 100% correctly.

RESULTS AND DISCUSSION. The results of the verb finiteness task are given in Table 3. The mean score for the group was 85% correct (adult-like finiteness judgments), with a standard deviation of 0.14. The histogram in Figure 3 illustrates that there is nonetheless variance in the sample, which is critical for measuring relationships in regression.

AGE GROUPS	*n*	MEAN SCORE (*SD*)
three-year-olds	10	68% (.15)
four-year-olds	23	86% (.13)
five-year-olds	30	88% (.11)

TABLE 3. Mean correct score and standard deviation on the English finiteness task by age.

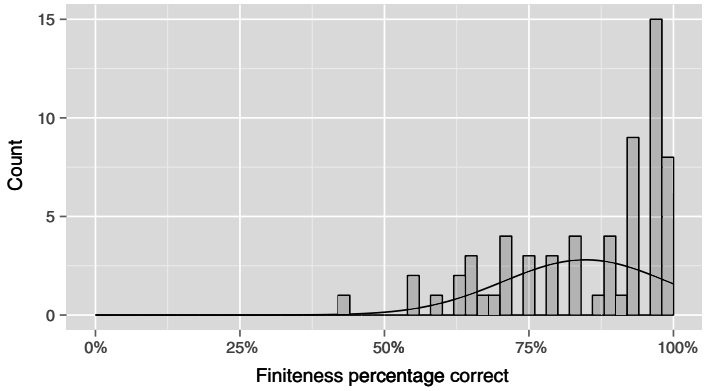

FIGURE 3. Histogram of child English finiteness judgments.

Results are significantly above chance (50%) by one-sample *t*-test ($t(62) = 19.375$, $p < 0.001$), and, as one might expect, age and proficiency correlate ($r = 0.490$, $p < 0.001$). Also, it is important to point out that there is variance in the scores of even our older children, as illustrated by the means and standard deviations in Table 3, which supports the contention that the optional infinitive stage is observable in children up to age 4;6–5;0, as illustrated by the best evidence we are aware of, which comes from a large sample of typically developing child English speakers in a longitudinal sample. Specifically, Rice, Wexler, and Hershberger (1998) and Rice, Wexler, and Redmond (1999) show in their MLU control groups, expressively and receptively, that child English speakers remain in the optional infinitive stage until 4;6–5;0. It is also worth mentioning that all finiteness markers correlated with one another, except *-ed* and auxiliary *be*, which were only marginally correlated ($r = 0.202$, $p = 0.10$).

4.2. EXPERIMENT 2: SUBJECT-AUXILIARY INVERSION IN CHILD ENGLISH. In this experiment, we seek to measure children's judgments of inverted vs. uninverted WH-questions.

PARTICIPANTS. The participants were the same sixty-three children who passed filler items on the finiteness test and on this test (age range = 3;1–5;11, mean age = 4;10).

PROCEDURES. The procedures for the SAI test were the same as for the verb finiteness task, except that the images were different and the experimental sentences were contrasting inverted and uninverted WH-questions, instead of declaratives. Both tests in English were administered to children within a two-week period, as were the Spanish tests discussed in the next section. Experimental items consisted of calling children's attention to a picture in the binder, as in Figure 4, accompanied by sentences such as those in 39.

(39) Experimental item for the SAI task

Penguin puppet:	Where the crab **does** live?
Lion puppet:	Where **does** the crab live?
Test administrator:	Who said it better, the penguin or the lion?

The distribution of experimental items in the SAI test was similar to that of the verb finiteness task, in that there were four warm-up and four filler items and twenty pairs of inverted and uninverted WH-questions. It is important to point out that in presenting the two question types to the children, experimenters took great pains to use the same WH-question intonation contour for both inverted and uninverted questions, in both this experiment and the Spanish subject-verb inversion experiment reported below.

The items used four different WH-pronouns (*when*, *where*, *what*, *why*) and five different auxiliaries (*did*, *does*, copula *is*, auxiliary *is*, and modal *can*), which combined for a total of twenty items. Table 4 illustrates the item types and gives their distributions.

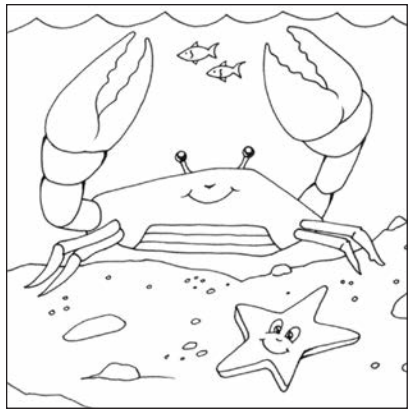

FIGURE 4. Sample picture to accompany inversion sentences.

	ADULT FORM	UNINVERTED FORM	# OF ITEMS
Copular *be*	When **is** the girl happy?	When the girl **is** happy?	4
Auxiliary *be*	Why **is** Pooh looking in the pot?	Why Pooh **is** looking in the pot?	4
Modal	Where **can** the baby turtle swim?	Where the baby turtle **can** swim?	4
Do-support (past)	What **did** the monkey eat?	What the monkey **did** eat?	4
Do-support (present)	Where **does** the crab live?	Where the crab **does** live?	4

TABLE 4. WH-question types and sample sentence pairs for the English task.

Warm-up and filler items in this test included misordered preposition-prepositional object pairs and determiner-noun pairs. Again, the purpose of these filler items is to determine whether children understand the format of the test, using a dimension of grammar unrelated to the one we are testing. These are the filler items from the inversion task.

(40) a. *The boy is building snowman a.
b. The boy is building a snowman.
(41) a. Aladdin can ride an elephant.
b. *Aladdin can ride elephant an.
(42) a. Mouse is in the pot.
b. *Mouse is the pot in.
(43) a. *Hippo splashed water the.
b. Hippo splashed the water.

RESULTS AND DISCUSSION. In Table 5, we give the results of the inversion task, by age. The mean score for the group was 78% correct, with a standard deviation of 0.18. Results are significantly above chance (50%) by one-sample *t*-test ($t(62) = 12.388$, $p < 0.001$). Inversion scores and age correlated ($r = 0.414$, $p = 0.001$). The histogram in Figure 5, again, illustrates the dispersion of scores.

AGE GROUPS	*n*	MEAN SCORE (*SD*)
three-year-olds	10	66% (.18)
four-year-olds	23	74% (.19)
five-year-olds	30	85% (.14)

TABLE 5. Mean correct score and standard deviation on the English inversion task by age.

Further, judgments for all WH-words used correlated with one another, except for *where* and *when*, which were marginal ($r = 0.226$, $p = 0.076$), and also correlated for all auxiliary types except *does* and auxiliary *is*, which were also marginal ($r = 0.232$, $p = 0.070$). As with the verb finiteness task, we see a range of proficiencies that increase

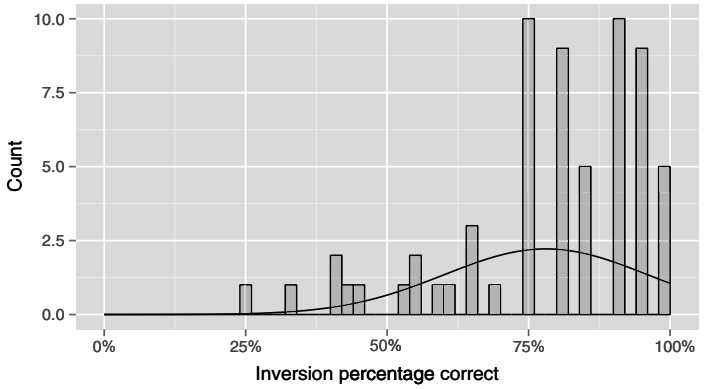

Figure 5. Histogram of child English inversion judgments (minus one outlier; see §5 for details).

as children mature, providing us with variance for our regression analysis, which we turn to next.[7]

5. DOES FINITENESS PREDICT INVERSION IN CHILD ENGLISH? In this section, we consider the degree to which the variance in child English speakers' judgments of verb finiteness predicts their judgments of subject-auxiliary verb inversion in WH-questions. Working with our sample of sixty-three children, we found finiteness judgments to be a significant predictor of inversion judgments ($B = 0.573$, $t(61) = 5.461$, $p < 0.001$). Finiteness judgments also explained a significant proportion of variance in inversion judgments ($r^2 = 0.328$, $F(1,61) = 29.820$, $p < 0.001$). Examining the boxplot of our data in Figure 6 we find that, though finiteness was a significant predictor in the first analysis, there is an extreme outlier. By TUKEY'S HINGES (Tukey 1977), an outlier is defined as lying 1.5 times outside the interquartile range. The interquartile range for inversion is 0.15. By removing the most extreme outlier, which lies three times outside the interquartile range at 0.25, we reduce the distortion in our data, illustrated in the boxplot in Fig. 6.

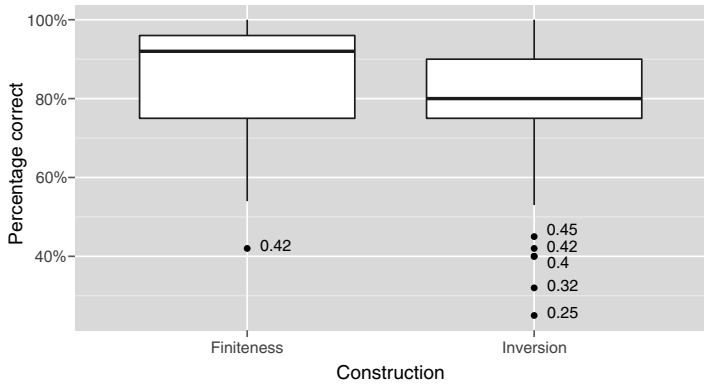

FIGURE 6. Boxplot of finiteness and inversion scores with individual percent correct values.

[7] It seems likely that both argument vs. adjunct status of WH-words and frequency, as well as possibly other variables, are relevant to the exact proportions of noninversion, which, though important and interesting, are not our central concern here.

Because outliers can create powerful distortions in maximal likelihood statistics, such as regression, we removed this participant's data and re-ran the regression, though we had already obtained a significant relationship, in order to express it most carefully. As before, a significant regression equation was found ($F(1,60) = 46.686$, $p < 0.001$), though this time with higher r^2 of 0.438. It is also worth noting that this relationship is not primarily mediated by age, as the r^2 of the regression of inversion judgments by finiteness is still 0.308, with unique variance attributed to age removed from the equation.

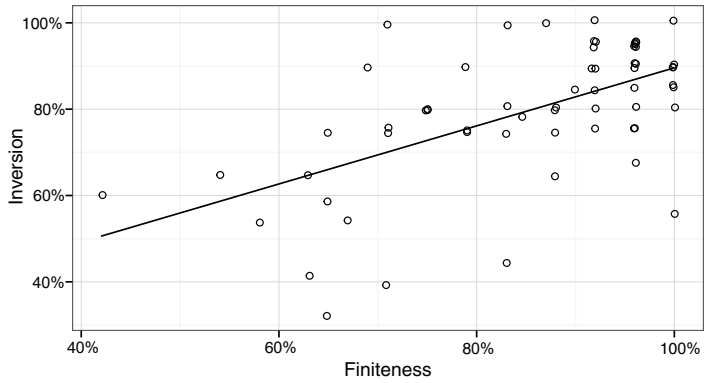

FIGURE 7. Scatterplot of inversion and finiteness judgments in child English ($r^2 = 0.438$, $p < 0.001$, $n = 62$).

The fact that variance in children's judgments of finiteness is a significant predictor of their judgments of inversion, as illustrated in Figure 7, confirms the connection between verb finiteness and SAI that has been a mainstay of generative studies of English for more than fifty years. The results are also consistent with the hypothesis that the optional inversion stage is a reflex of the optional infinitive stage. Now let us consider whether this apparently explanatory account of inversion and finiteness in English should be extended to Spanish.

6. SPANISH EXPERIMENTS: METHODS. In the previous section, we saw that child English speakers' judgments of optional finiteness predicted their judgments of optional inversion. Now we turn to the question of whether this same kind of connection supports a similar analysis of adult Spanish. On the one hand, inversion and finiteness in Spanish appear superficially very similar to English, so we might expect English- and Spanish-speaking children to also behave very similarly. On the other hand, however, we have seen some important differences in inversion between adult speakers of the two languages, including an apparent lack of a relation between finiteness and inversion in adult Spanish, so from that perspective, we might expect Spanish-speaking children to behave differently from the English-speaking children. As before, we test a sample of child Spanish speakers in the optional infinitive stage to determine whether there is a predictive relationship between their judgments of verb finiteness and their judgments of subject-verb inversion.

6.1. EXPERIMENT 3: FINITENESS MARKING IN CHILD SPANISH.

PARTICIPANTS. Fifty-six monolingual Spanish-speaking children in Mexico City participated in this experiment. Twelve children did not pass at least six of the eight filler items on this test as well as the inversion test, leaving forty-four children (age range = 3;2–6;6, mean age = 4;9). Note that this is virtually identical to the age range and mean age of the child English sample (sample participant ages between English and Spanish were not significantly different from each other: $t(105) = 16.578$, $p = 0.498$).

Procedures. As in the English experiments, children were introduced to two puppets and told that they were babies, just learning to talk, and that the children needed to help them learn to speak more like big kids by telling them who had said the sentence best. The experiment consisted of four warm-up items, eight filler items, and sixteen experimental items. Half were presented in the present tense and the other half in the preterit (simple, perfective past) tense. The putative nonfinite forms tested in this experiment, following Grinstead, De la Mora, Pratt, & Blanca Flores 2009, included the morphological infinitive (e.g. *cantar* 'to sing') and the bare stem (e.g. *canta* 'sing'). Because of the homophony possible in the second person with the imperative (e.g. *Tú canta* could be an adult-like second-person familiar imperative, as well as a child-specific nonfinite, bare-stem version of the adult indicative *Tú cantas*), only morphological infinitives were presented with second-person singular *tú* subjects. The same was done with third singular subjects, such as *Él canta*, as it is homophonous with the present indicative form. Items were presented in three different orders to control for effects stemming from order of presentation. None were found ($p > 0.05$).

As before, items were counterbalanced for which puppet spoke first and for which one was correct. Children were explicitly admonished in the warm-up phase that this was not a good way to figure out which puppet had said the sentence best, which was illustrated with each puppet making a mistake and with both the first speaker and the second speaker making mistakes. Warm-up and filler items in this experiment consisted of incorrect preposition-prepositional object order and incorrect plural marking, including the following.

(44) a. Tú juegas en el parque.
you play in the park
b. *Tú juegas el parque en.
you play the park in

(45) a. Yo tengo muchas sillas.
I have many chairs
b. *Yo tengo muchas silla.
I have many chair

Children had to give correct answers to at least six of the eight filler items in order to be included in the sample for both this experiment and the inversion experiment. It is important to point out that /s/ deletion is not a dialect feature of this variety of Spanish and that children use this feature in an adult-like way from a substantially earlier age than the age of our sample (Kernan & Blount 1966, Grinstead, Cantú-Sánchez, & Flores-Avalos 2008).

The experimental items on the Spanish finiteness test consisted of a larger array of possibilities than in the English test, because Spanish is a more highly inflected language. The three subject types tested were the first-person singular pronoun *yo*, the second-person singular pronoun *tú*, and a third-person singular noun phrase *el gato* 'the cat'. The subject pronoun *yo* was combined with both a bare stem and a morphological infinitive, in both past and present, while the subject pronoun *tú* and the noun phrase *el gato* were combined only with morphological infinitives in past and present, in order to avoid the homophony confound mentioned above. Table 6 illustrates the item types and gives their distributions, and a sample picture is given in Figure 8.

Results. The results of the verb finiteness task are given in Table 7. Results are significantly above chance (50%) by one-sample *t*-test ($t(43) = 25.116$, $p < 0.001$). The mean score for the group was 90% correct (adult-like finiteness judgments), with a standard deviation of 0.11. Again, age and score correlated ($r = 0.674$, $p < 0.001$). The

	ADULT FORM			# OF ITEMS:
SUBJECT	PRESENT	PAST	NONFINITE FORM	PRES/PAST
yo (1SG)	Yo tengo una taza. 'I have a cup.'	Yo tuve una casa. 'I had a house.'	Yo **tiene** una casa.	2 / 2
yo (1SG)	Yo tengo una taza. 'I have a cup.'	Yo tuve una casa. 'I had a house.'	Yo **tener** una casa.	2 / 2
tú (2SG)	Tú tienes una mesa. 'You have a table.'	Tú tuviste una mesa. 'You had a table.'	Tú **tener** una mesa.	2 / 2
el gato	El gato tiene una flor. 'The cat has a flower.'	El gato tuvo una flor. 'The cat had a flower.'	El gato **tener** una flor.	2 / 2

TABLE 6. Finiteness morpheme types and sample sentence pairs for the Spanish task.

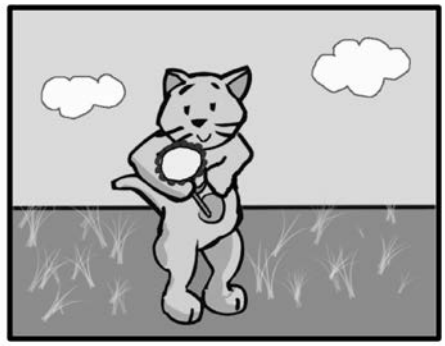

FIGURE 8. Sample picture to accompany verb finiteness sentence *El gato tiene una flor*.

dispersion of the children's scores is illustrated in the histogram in Figure 9. As with the child English finiteness judgments, here too we find variance, which is critical for establishing a relationship between these scores and those of the inversion judgment task. The variance is more compacted toward the correct end of the spectrum in the Spanish data than it is in the English—as we would expect, given the literature on the topic—yet variance exists, especially in the younger children.

AGE GROUPS	*n*	MEAN SCORE (*SD*)
three-year-olds	10	82% (.10)
four-year-olds	13	84% (.11)
five-year-olds	13	96% (.06)
six-year-olds	8	99% (.02)

TABLE 7. Mean correct score and standard deviation on the Spanish finiteness task by age.

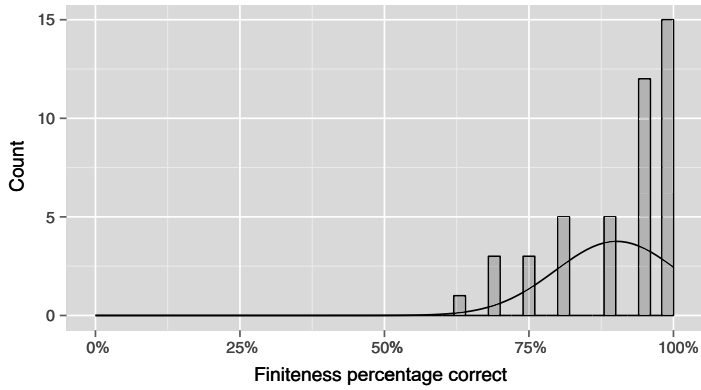

FIGURE 9. Histogram of child Spanish finiteness judgments.

The children in the sample produced optional infinitive-type judgments, which decreased with age, as illustrated in Table 7. Mean scores for past tense (88% correct) and present tense (92% correct) were not significantly different from one another ($p > 0.05$).

6.2. EXPERIMENT 4: SUBJECT-VERB INVERSION IN CHILD SPANISH. This experiment uses the format of the grammaticality choice task, just as the others did, to measure child Spanish speakers' judgments of inverted and uninverted WH-questions.

PARTICIPANTS. The participants in this experiment were the same forty-four children (age range = 3;2–6;6, mean age = 4;9) who passed at least six of eight of the filler items on the finiteness test and this test.

PROCEDURES. The experiment included four warm-up and eight filler items, with eighteen experimental items. The subjects used in the experimental sentences were either a second singular pronoun (*tú*), third plural pronoun (*ellos*), or a full noun phrase (*el gato* 'the cat'). These were combined with three WH-words (*dónde* 'where', *cuándo* 'when', and *qué* 'what'). The verbs used were either *romper* 'to break' or *comer* 'to eat', and all were given in the present tense. Sentences were all nine syllables long, to control for phonetic length as a variable, and were provided in one of three orders in order to control for effects of order of presentation. None were found ($p > 0.05$). Filler sentences, as in the finiteness task, contrasted either plural-marking errors or preposition-prepositional object order errors with corresponding adult-like sentences (see 44–45 above). Sample experimental sentences and their distributions are given in Table 8, and a sample picture in Figure 10.

SUBJECT	DÓNDE 'WHERE'	CUÁNDO 'WHEN'	QUÉ 'WHAT'	# OF ITEMS
tú (2SG)	¿Dónde comes la galleta tú? 'Where do you eat the cookie?'	¿Cuándo comes el plátano tú? 'When do you eat the banana?'	¿Qué comes en la mesita tú? 'What do you eat at the table?'	2 / 2 / 2
	¿Dónde tú comes la galleta? 'Where you do eat the cookie?'	¿Cuándo tú comes el plátano? 'When you do eat the banana?'	¿Qué tú comes en la mesita? 'What you do eat at the table?'	
ellos (3PL)	¿Dónde rompen la mesa ellos? 'Where do they break the table?'	¿Cuándo rompen el reloj ellos? 'When do they break the watch?'	¿Qué rompen en la casa ellos? 'What do they break in the house?'	2 / 2 / 2
	¿Dónde ellos rompen la mesa? 'Where they do break the table?'	¿Cuándo ellos rompen el reloj? 'When they do break the watch?'	¿Qué ellos rompen en la casa? 'What they do break in the house?'	
el gato (3SG)	¿Dónde rompe tazas el gato? 'Where does the cat break the cups?'	¿Cuándo rompe la flor el gato? 'When does the cat break the flower?'	¿Qué rompe en la casa el gato? 'What does the cat break in the house?'	2 / 2 / 2
	¿Dónde el gato rompe tazas? 'Where the cat does break the cups?'	¿Cuándo el gato rompe la flor? 'When the cat does break the flower?'	¿Qué el gato rompe en la casa? 'What the cat does break in the house?'	

TABLE 8. WH-question types and sample sentence pairs for the Spanish task.

RESULTS. The mean correct score for children on the inversion task was 59%, with a standard deviation of 0.12. The results of children's judgments of uninverted WH-questions in Spanish were very interesting at several levels. Most importantly, the sample's mean score was not random, but rather was significantly above chance, which was 50% ($t(43) = -2.859$, $p = 0.007$). Also, notice that the standard deviation of the scores in Table 9 below is not huge, compared to the others, suggesting that there is not greater individual variation on this test than on the others. The histogram in Figure 11 shows that instead of having the leftward skew of the other data distributions, with a substantial number of children clustered at the 100% correct end, the largest cluster of children

FIGURE 10. Sample picture to accompany verb finiteness sentence *¿Dónde come panes el gato?*.

on this test is in the middle, consistent with the idea that this phenomenon follows a different developmental trajectory from the others.

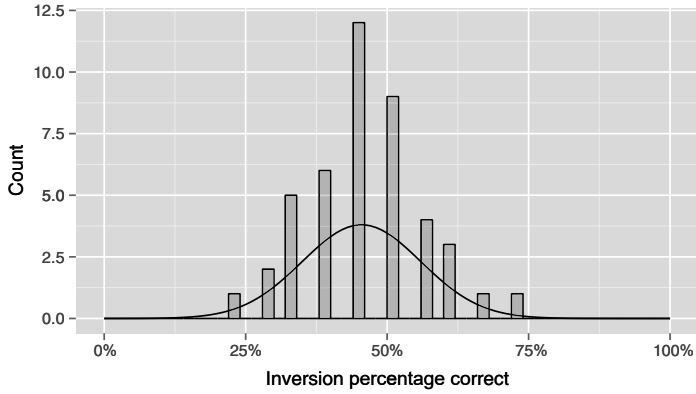

FIGURE 11. Histogram of child Spanish inversion judgments.

In contrast to the English finiteness experiment, in which adult controls provided 100% acceptance judgments with zero variance or exceptions, adult Spanish speakers did not give 100% acceptance judgments of uninverted WH-questions as ungrammatical on our task. This contrasts with the adult Spanish-speaker judgments of finiteness, which were 100% with zero variance. It also contrasts with adult judgments of inversion in English, which were uncontroversially 100%. Instead, Spanish inverted WH-questions were chosen at a rate of 85% (SD = 0.08) when presented with contrasting uninverted WH-questions (standardly taken to be clearly ungrammatical by native-speaker consultants from Mexico who are linguists). Notice in the histogram of adult (n = 16) inversion judgments in Figure 12 that the central tendency has simply shifted right, in comparison to the child judgments in Fig. 11, and has not migrated entirely to 100%, as in the other three tests. This is in line with our discussion in §2, where we saw a number of ways in which inversion in Spanish behaves differently from its counterpart in English.

Children's judgments (mean score = 59% correct, SD = 0.12) were significantly lower than adults by t-test ($t(58) = -8.204$, $p < 0.001$). As illustrated in Table 9, chil-

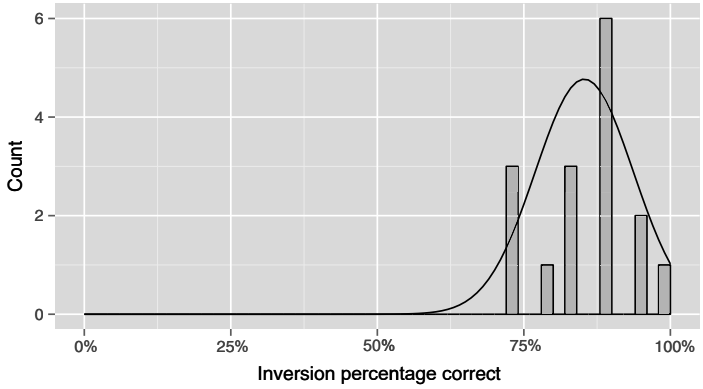

FIGURE 12. Histogram of adult Spanish inversion judgments.

dren's scores did not correlate with age ($r = -0.166$, $p = 0.280$). This absence of an age correlation, in contrast to the other three tests, is also supportive of the idea that inversion in Spanish is somehow different from many other syntactic phenomena, the development of which does tend to correlate with age (Brown 1973).

AGE GROUPS	*n*	MEAN SCORE (*SD*)
three-year-olds	10	64% (.08)
four-year-olds	13	54% (.12)
five-year-olds	13	61% (.14)
six-year-olds	8	53% (.10)

TABLE 9. Mean correct score and standard deviation on the Spanish inversion task by age.

Children's judgments of uninverted WH-questions also did not correlate with one another by WH-word ($p > 0.05$), as they did in English. Their distribution, however, was consistent with Torrego's (1984) observation that nonargumental WH-words tolerate noninversion better than argumental WH-words, in the sense that *cuándo* 'when' was significantly more likely to be acceptable as uninverted than both *qué* 'what' ($t(43) = 2.718$, $p = 0.009$) and *dónde* 'where' ($t(43) = 2.083$, $p = 0.043$). That *dónde* (65% correct mean score) was less like *cuándo* (51% mean score) and more like *qué* (63% mean score), though nonargumental, is consistent with Erreich's (1984) findings that *where* in child English also does not allow noninversion as much as other adjunct-type WH-words. Parallel, but up-shifted, means were seen in the adult controls (*dónde*: 87%, *cuándo*: 77%, *qué*: 93%). Though the distribution of inversion scores in child Spanish does not resemble the distribution of inversion scores in child English, it nonetheless displays variance, which is critical for the regression analysis to which we turn next.

7. DOES FINITENESS PREDICT INVERSION IN CHILD SPANISH? To determine whether finiteness judgments predict inversion judgments in Spanish, as was demonstrated above for English, we fit a linear-regression model to the data. Working with our sample of forty-four children, we found finiteness judgments to not be a significant predictor of inversion judgments ($B = -0.251$, $t(42) = -1.680$, $p = 0.10$). Finiteness judgments did not explain a significant proportion of variance in inversion judgments ($r^2 = 0.063$, $F(1,42) = 2.822$, $p = 0.10$). Compare the scatterplot in Figure 13 with that in Fig. 7 above for child English finiteness and inversion judgments.

The absence of a predictive relationship between finiteness and inversion that we see here is entirely consistent with the facts about adult Spanish that we observed in §2. We

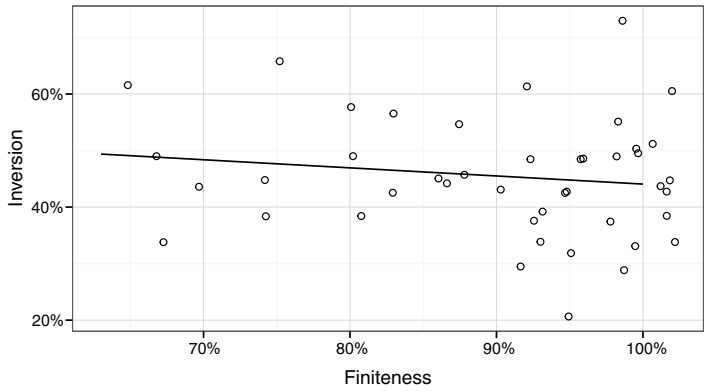

FIGURE 13. Scatterplot of inversion and finiteness judgments in child Spanish ($r^2 = 0.063$, $p = 0.10$, $n = 44$).

saw there that, unlike English, Spanish inversion does not seem to relate directly to finiteness. This included the fact that there is substantial evidence that Spanish inversion does not involve movement of the verb to C, a head position often associated with finiteness. It is very striking that these observations, based on analyses of the adult grammar, receive such clear corroboration from child Spanish, and that the results from Spanish and English are so different, despite the nearly identical ages of the Spanish and English samples, the nearly identical complexity of the stimuli, and the nearly identical types of experimental measures used.

8. FINITENESS-INVERSION CONNECTIONS DIFFER BY LANGUAGE. To see most clearly that there is a difference in the degree to which finiteness predicts inversion between Spanish and English child languages, we fit a multiple linear-regression model to the data of the English-speaking and Spanish-speaking children in our sample ($n = 106$). Predictor variables in this model included the continuous variable Finiteness and the categorical variable Language, while the outcome variable was Inversion. Both continuous variables were centered on the mean. Results showed a significant main effect of Language ($B = 0.209$, $SE = 0.025$, $t = 8.266$, $p < 0.001$) and a significant main effect of Finiteness ($B = 0.745$, $SE = 0.121$, $t = 6.162$, $p < 0.001$). Overall r^2 for the model was 0.547. Most importantly, there was a significant interaction of Language and Finiteness ($B = 1.103$, $SE = 0.219$, $t = 5.027$, $p < 0.001$), indicating a significant difference between the predictive relationship of English finiteness and inversion vs. Spanish finiteness and inversion, illustrated in Figure 14.

To illustrate the difference between children's judgments of the two constructions in the two languages, the bar graph in Figure 15 shows that, though finiteness judgments in child English predict inversion judgments, they are significantly different from one another (Mann-Whitney $U = 1429$, $Z = -2.595$, $p = 0.009$). In child Spanish, finiteness scores do not predict inversion scores, but they are nonetheless significantly different (Mann-Whitney $U = 5$, $Z = -8.035$, $p < 0.001$), as in English, and in the same direction. This is consistent with our contention that inherently different processes underlie inversion in the two languages.

9. DISCUSSION.

9.1. RESEARCH QUESTIONS. First, let us return to our research questions. With respect to the question of whether finiteness judgments are predictive of inversion judgments in child English, the answer is affirmative. If one assumes that inversion and finiteness are

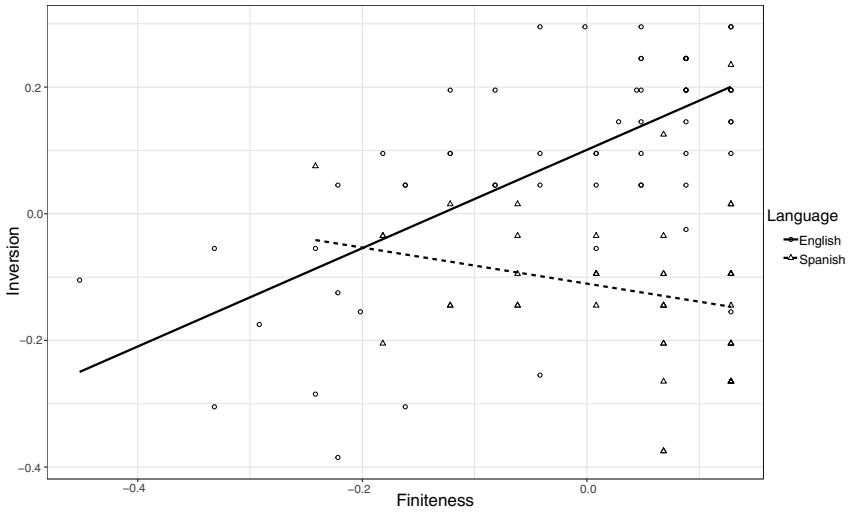

FIGURE 14. Overlay scatterplot of the regression of Inversion and Finiteness, both centered on the mean, in child Spanish and English.

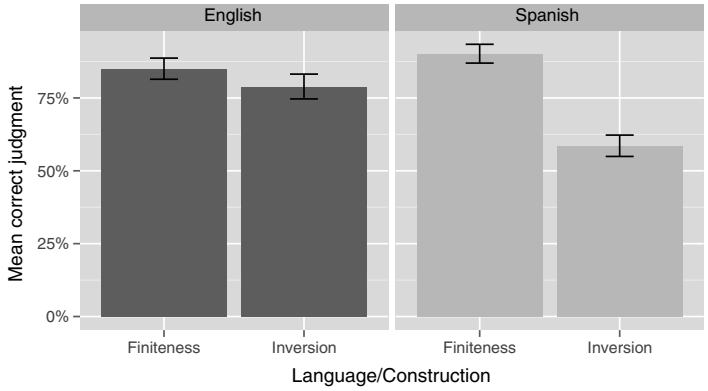

FIGURE 15. Child Spanish and English mean percentage correct for finiteness and inversion.

unrelated, or that morphologically adult-like, syntactically unspecified forms are not part of child language, then these results are mysterious. Further, we note once again that based on analyses of the adult grammar, finiteness has long been assumed to be crucially involved in English inversion, and the results that we have obtained here are entirely consistent with this view. More specifically, our evidence lends support to the hypothesis that the optional infinitive phenomenon is at the root of the optional inversion phenomenon.

Second, with respect to the question of whether this same predictive relationship exists in Spanish child language, the answer appears to be negative. In the face of a null finding, there is always the concern that the experiment simply failed to find a relationship that actually exists, but in this case, our null finding sits easily with other facts about Spanish that we have seen. For instance, finiteness does not seem to be crucially involved in Spanish inversion, and there is substantial evidence from a variety of sources that Spanish inversion is not a case of movement to C. Our findings do not re-

solve the question of the proper treatment of Spanish inversion (a difficult and contentious issue, as we saw in §2), but they do lend further support to the view that although English and Spanish inversion may appear very similar superficially, they are at their core very different phenomena. As we have seen here, this difference is seen in a very striking fashion in child language as well, in that inversion shows a very different trajectory of development between the two languages.

9.2. UNDERSPECIFIED FORMS. A problem for generative approaches to morphosyntactic development has been the persistence of phenomena that do not follow from syntactic theory, where that theory is assumed to follow a particular view of the CONTINUITY ASSUMPTION (Macnamara 1982). The continuity assumption says that children and adults are using the same atomic grammatical elements and the same computations that range over those elements in their grammatical systems. This assumption implies that children do not undergo a dramatic transformation into adults with qualitatively distinct symbols and computations in their grammatical systems, avoiding the learnability obstacle posed for theories of language development (e.g. Tomasello 1995, 2000) that assume no equivalence between child and adult linguistic systems. A particular view of this assumption has been that where children use a word form, that word form must have all of the same properties of that word form in the adult system. In our study, we have argued that child English uninverted WH-questions, such as *Where the raisins is?* (from Ingram & Tyack 1979), include a verb form that is not specified for all of the features it needs to be specified for, in order to move from I to C. Our contrasting view of the continuity assumption claims that children make use of word forms that are not necessarily specified for all of the features that the adult form of *be* is specified for. This approach can be viewed as continuous if we assume that adults also have access to word forms that are not fully specified for the system one is acquiring—an experience that anyone learning a second language has certainly become familiar with.

If this approach to developing verb forms is correct, it not only explains uninverted WH-questions with auxiliaries to the right of the subject, but also explains why verbs marked with *-s* can sometimes occur with nonnominative pronominal subjects. In influential work on this topic, Schütze and Wexler (1996) propose that, by CASE THEORY, as formulated using MINIMALIST syntax and a particular distributed-morphology account of English morphosyntax, nonnominative subjects should not occur with third singular present-tense verbs (e.g. *Him walks*) because the morpheme *-s* is always associated, on their account, with underlying syntactic features of agreement, which are responsible for checking nominative case in subject position. This should make this combination impossible. Indeed, the combination is rare; however, Ambridge and Pine (2006) and Pine, Rowland, Lieven, and Theakston (2005) have demonstrated that it nonetheless occurs in nontrivial numbers in spontaneous production. Notice that abandoning this particular view of the continuity assumption and allowing for unspecified elements permits us to retain the obviously correct intuition behind Schütze and Wexler's proposal, which is that children obey the CASE FILTER. That Schütze and Wexler are correct is confirmed in Rispoli 2005, which shows that, after a period during which lexical development confounds the connection between verb finiteness and nominative case, verb finiteness and nominative case in subject position come to be very highly correlated. Further confirmation is provided by Grinstead, Donnellan, Barajas, and Johnson (2014), who show that children's judgments of verb finiteness very strongly predict their judgments of nominative vs. nonnominative case pronominal subjects ($r = 0.525$, $p < 0.001$, $n = 49$). Of the children in the study, 20% allowed third singular *-s* at least some of the time with a nonnominative pronominal subject (e.g. *Him holds a camera*). In our view of, especially, de-

velopmental morphosyntax, it seems worthwhile to at least entertain the possibility that initially underspecified verb forms are part of the process of language development and that the forms themselves may appear to have affixes in child grammar that are not in fact associated with the full complement of syntactic features we hypothesize them to be associated with in the adult systems.

10. Conclusion. If a theory of cognition, linguistic cognition in this case, is to be worth its salt, it should be able to make predictions for what will happen when the system it seeks to characterize is missing important pieces. In this case, the piece we are concerned with is tense. Its immaturity in children makes it a fascinating missing piece to consider, in that it plays multiple important, and language-specific, roles in grammar. The work presented here complements previous work that demonstrates a predictive relationship between tense and nominative case on pronominal subjects in child English (e.g. *Him crosses the street* vs. *He crosses the street*). This work holds particular interest in that children diagnosed with SLI appear to have special problems with tense marking, which makes it possible to use tense as a clinical marker capable of diagnosing children who are monolingual speakers of English or Spanish, simply on the basis of what they know about tense.

In previous work, we have claimed in the INTERFACE DELAY HYPOTHESIS that tense is one of an array of discourse-sensitive syntactic constructions that depend on either nominal or verbal anaphora, including definite articles, null subjects, and direct object clitics, stemming from children's developing ability to access the conversational common ground with their syntax. In contrast, more local, discourse-insensitive syntactic dependencies, such as nominal plural marking and noun-adjective agreement, seem to be acquired early and to be relatively robust, even in atypical language development. Though tense seems to be a particularly sensitive component of this array of vulnerable constructions, there are certainly others that could possibly be delayed, due to a single, underlying dimension of cognitive growth, to wit, the interface between syntax and discourse-pragmatics. The picture, of course, is not a simple one. The role of the developing computational lexicon, sometimes fully specified and adult-like, other times underspecified and child-particular, adds an additional layer of complexity to the puzzle that is cognitive development. In future work, we hope to give greater substance and predictive power to this hypothesis by examining the interactions of more of these constructions throughout the course of development, always with an eye toward the relevance of child language data for theories of linguistic and nonlinguistic cognition.

Appendix A: English finiteness sentence pairs

Warm-up

1a. The girl is hugging the tiger.	1b. The girl is hug the tiger.
2a. The cat is watch the fish.	2b. The cat is watching the fish.
3a. Donald is taking a bath.	3b. Donald is take a bath.
4a. Cookie Monster is bake pies.	4b. Cookie Monster is baking pies.

Task

1a. Scooby is loud.	1b. Scooby loud.
2a. The mama elephant lift the baby elephant.	2b. The mama elephant lifted the baby elephant.
3a. Duck holding a cactus.	3b. Duck is holding a cactus.
4a. Oscar flies a kite.	4b. Oscar fly a kite.
5a. The girl is swim.	5b. The girl is swimming.
6a. The bear played in the sand.	6b. The bear play in the sand.
7a. Rabbit is watering the garden.	7b. Rabbit watering the garden.
8a. Piglet eat watermelon.	8b. Piglet eats watermelon.
9a. Daisy raked all the leaves.	9b. Daisy rake all the leaves.

10a. The girl is picking flowers.	10b. The girl is pick flowers.
11a. The dinosaur is big.	11b. The dinosaur big.
12a. The monkey eats ice cream.	12b. The monkey eat ice cream.
13a. Donald angry.	13b. Donald is angry.
14a. Goofy is playing soccer.	14b. Goofy playing soccer.
15a. Mickey is dancing.	15b. Mickey is dance.
16a. The boy jump in the water.	16b. The boy jumped in the water.
17a. Snow White sing to the animals.	17b. Snow White sings to the animals.
18a. Garfield is hungry.	18b. Garfield hungry.
19a. Kermit driving the racecar.	19b. Kermit is driving the racecar.
20a. The bear is watching the butterfly.	20b. The bear is watch the butterfly.
21a. The bear goes down the slide.	21b. The bear go down the slide.
22a. The bear play with the toy train.	22b. The bear played with the toy train.
23a. The sun is happy.	23b. The sun happy.
24a. The boy rides the bike.	24b. The boy ride the bike.
25a. Spongebob sad.	25b. Spongebob is sad.
26a. Pooh is eating honey.	26b. Pooh eating honey.
27a. The boy row the boat.	27b. The boy rowed the boat.
28a. Mr. Cowboy is riding a horse.	28b. Mr. Cowboy riding a horse.

Appendix B: English inversion question pairs

Warm-up

1a. Elmo played with the puppy.	1b. Elmo played with puppy the.
2a. Garfield eats popcorn the.	2b. Garfield eats the popcorn.
3a. The kitty is the plane in.	3b. The kitty is in the plane.
4a. The girl holds the umbrella.	4b. The girl holds umbrella the.

Task

1a. What did the monkey eat?	1b. What the monkey did eat?
2a. Where the crab does live?	2b. Where does the crab live?
3a. Why the puppy is scared?	3b. Why is the puppy scared?
4a. When is Spongebob surfing?	4b. When Spongebob is surfing?
5a. The boy is building snowman a.	5b. The boy is building a snowman.
6a. What can Tigger do?	6b. What Tigger can do?
7a. When did Pooh have lunch?	7b. When Pooh did have lunch?
8a. Why the seal does balance the ball?	8b. Why does the seal balance the ball?
9a. Where is the turtle sledding?	9b. Where the turtle is sledding?
10a. Aladdin can ride an elephant.	10b. Aladdin can ride elephant an.
11a. Where Daisy is?	11b. Where is Daisy?
12a. Why the cat did climb the blocks?	12b. Why did the cat climb the blocks?
13a. When can the boy blow bubbles?	13b. When the boy can blow bubbles?
14a. What does the girl play?	14b. What the girl does play?
15a. Mouse is in the pot.	15b. Mouse is the pot in.
16a. Where the baby turtle can swim?	16b. Where can the baby turtle swim?
17a. When Garfield does hug the bear?	17b. When does Garfield hug the bear?
18a. What is the girl?	18b. What the girl is?
19a. Why Pooh is looking in the pot?	19b. Why is Pooh looking in the pot?
20a. Hippo splashed water the.	20b. Hippo splashed the water.
21a. When is the girl happy?	21b. When the girl is happy?
22a. Where the bear did jump?	22b. Where did the bear jump?
23a. What is the elephant reading?	23b. What the elephant is reading?
24a. Why will the boy sing?	24b. Why the boy will sing?

Appendix C: Spanish finiteness sentence pairs

Warm-up

1a. Yo como fresas muchas.	1b. Yo como muchas fresas.
2a. Aquí tú ves tele la.	2b. Aquí tú ves la tele.
3a. Yo saco una foto.	3b. Yo saco foto una.
4a. Yo tengo muchos globos.	4b. Yo tengo mucho globo.

TASK

1a. Tú tienes una mesa.	1b. Tú tener una mesa.
2a. Yo tiene una taza.	2b. Yo tengo una taza.
3a. Yo tengo una foto.	3b. Yo tener una foto.
4a. El gato tener una flor.	4b. El gato tiene una flor.
5a. Tú comes una fresa.	5b. Tú comer una fresa.
6a. Yo comer una pera.	6b. Yo como una pera.
7a. Yo como una torta.	7b. Yo come una torta.
8a. El gato comer huevo.	8b. El gato come huevo.
9a. Tú tuviste un globo.	9b. Tú tener un globo.
10a. Yo tuve una taza.	10b. Yo tiene una taza.
11a. Yo tuve una casa.	11b. Yo tener una casa.
12a. El gato tuvo flores.	12b. El gato tener flores.
13a. Tú comer una fresa.	13b. Tú comiste una fresa.
14a. Yo comí un manguito.	14b. Yo comer un manguito.
15a. Yo come una torta.	15b. Yo comí una torta.
16a. El gato comió huevo.	16b. El gato comer huevo.

APPENDIX D: SPANISH INVERSION QUESTION PAIRS

WARM-UP

1a. Ustedes juegan en el pasto.	1b. Ustedes juegan en pasto el.
2a. Yo tengo muchas pelotita.	2b. Yo tengo muchas pelotitas.
3a. El gato baila el parque en.	3b. El gato baila en el parque.
4a. Ellos juegan en la cocina.	4b. Ellos juegan en cocina la.

TASK

1a. ¿Dónde ellos rompen la mesa?	1b. ¿Dónde rompen la mesa ellos?
2a. ¿Dónde tú rompes la casita?	2b. ¿Dónde rompes la casita tú?
3a. ¿Dónde el gato rompe tazas?	3b. ¿Dónde rompe tazas el gato?
4a. ¿Cuándo rompen el reloj ellos?	4b. ¿Cuándo ellos rompen el reloj?
5a. ¿Cuándo tú rompes la pelota?	5b. ¿Cuándo rompes la pelota tú?
6a. ¿Cuándo el gato rompe la flor?	6b. ¿Cuándo rompe la flor el gato?
7a. ¿Qué rompen en la casa ellos?	7b. ¿Qué ellos rompen en la casa?
8a. ¿Qué rompes en la escuela tú?	8b. ¿Qué tú rompes en la escuela?
9a. ¿Qué el gato rompe en casa?	9b. ¿Qué rompe en casa el gato?
10a. ¿Dónde ellos comen los tacos?	10b. ¿Dónde comen los tacos ellos?
11a. ¿Dónde tú comes la galleta?	11b. ¿Dónde comes la galleta tú?
12a. ¿Dónde come panes el gato?	12b. ¿Dónde el gato come panes?
13a. ¿Cuándo comen la sopa ellos?	13b. ¿Cuándo ellos comen la sopa?
14a. ¿Cuándo tú comes el plátano?	14a. ¿Cuándo comes el plátano tú?
15a. ¿Cuándo come panes el gato?	15b. ¿Cuándo el gato come panes?
16a. ¿Qué ellos comen en la casa?	16b. ¿Qué comen en la casa ellos?
17a. ¿Qué comes en la mesita tú?	17b. ¿Qué tú comes en la mesita?
18a. ¿Qué come ahora el gato?	18b. ¿Qué el gato come ahora?

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